

REMARKS

An Office Action was mailed on September 7, 2004. Claims 1-3 are pending, of which claim 1 is the sole independent claim. Claims 4-11 were withdrawn. Applicant now cancels claims 4-11, but reserves the right to file a divisional application on these claims.

By the foregoing claim 1 is amended to more clearly define the present invention.

Claims 1-3 stand rejected under 35 U.S.C. §103(a) as being unpatentable over European Patent Specification 0 304 162 B1 to Hekman in view of European Patent Application EP 0707 913 A1 to Cavallo.

The present invention is directed at a method of breaking the bearing eye of a connecting rod, i.e. conrod, typically used in combustion engines. Conrods are subject to intense stress due to their position between the camshaft and the pistons. Thus, deformations and latent stresses when the end cap is cleaved, i.e. severed, are detrimental to life cycles and are limiting in application. The present invention provides novel and distinctive methods of cleaving the end cap from the conrod.

As now claimed by the sole independent claim, claim 1, a wedge 16 having an inclined surface and a vertical surface is driven between a first displaceable mandrel half 11 and a second fixed mandrel half 12. The first mandrel half 11 has an inclined surface 15 opposing a vertical surface of the second mandrel half. The wedge 16 is advantageously oriented so that the inclined surfaces meet and slide on each other causing the first mandrel half 11 to displace.

Consequently, the mandrel breaks the bearing eye 6 and simultaneously the first mandrel half 11 moves the now severed end cap 5 of the conrod 1 away from the bearing shell of the remainder of the conrod 1.

Advantageously, the present invention splits the end cap bearing shell from the other bearing shell across the pair of legs of the bearing eye simultaneously. Doing so prevents undesired deformations.

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Hekman, Cavallo, or a combination of the two does not suggest or teach the present invention. Hekman appears to teach applying a fracture ram 55 to double-sided wedge 62 to break the bearing eye of the conrod 20 while the end cap and the remainder of the conrod are clamped. Please see Fig. 7. Therein, Hekman fails to appreciate the present invention where wedge 16 acts only on the end cap of the conrod 1 splitting the pair of legs of the bearing eye across the breaking plane simultaneously. Hekman, in fact, teaches away and teaches a method that leads to consecutive, not simultaneous, breaking of the legs of the conrod bearing eye. Please see col 2, line 55 to col. 3, line 7; similarly, col. 7 lines 4-15.

Cavallo appears to teach cleaving the cap 12 of connecting rod 11 using an actuator responsive to a hydraulic medium disposed between two fixtures. Cavallo does not teach or suggest, as is claimed in the present invention, fixing the position of the bearing eye, relative to one mandrel half on one side of the breaking plane by means of adjustable stops, while on the other side of the breaking plane the bearing eye is not positionally fixed but is held with play relative to the other mandrel half.

Cavallo teaches away from the present invention since, at least, Cavallo teaches the use of a first and second retention devices to retain the conrod in a working position on the machine. Please see col. 4, lines 39-45. Furthermore, Cavallo teaches opposite to the present invention of immobilizing the bearing eye 11b of the conrod with a third retention device 22. Please see col. 4, lines 52-55.

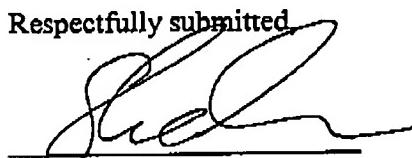
Neither does a combination of Cavallo and Hekman (cited in combination for teaching subjecting the bearing eye to an initial stress) teach or suggest the present invention since it is not clear that the combination would lead a skilled artisan to a workable model that is in anyway different than that of Hekman. While Cavallo clearly recognizes hydraulic and mechanical parting apparatus are different when applied to breaking bearing shells. Mechanical apparatus do not result in elongations or yielding of the bearing eye during parting. Please see Cavallo col. 2, lines 31-39. Although Cavallo attempts to solve the problem of using advantageous elements of each Cavallo, Cavallo does so by immobilizing the conrod while Hekman does not.

Applicant believes the present application is now in condition for allowance. All dependent claims are allowable for at least the same reasons as the independent claim from which they depend.

However, if for any reason the Examiner should consider this application not to be in condition for allowance, the Examiner is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged on Deposit Account 50-1290.

Respectfully submitted,



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- 6 -